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ABSTRACT

The Alaska Rural Systemic Initiative (AKRSI) was established in 1994 under the auspices of the Alaska Native/Rural Education Consortium, representing over 50 organizations concerned with education in rural Alaska. Its purpose is to implement initiatives that systematically document the indigenous knowledge systems of Alaska Native peoples and develop pedagogical practices that integrate indigenous knowledge into all aspects of education. In practical terms, the intended outcome is increased recognition of the complementary nature of Native and Western knowledge, so both can be more effectively utilized in the school curriculum and educational philosophy. The AKRSI is organized around five initiatives: Native ways of knowing/teaching, culturally aligned curriculum, indigenous science knowledge base, elders and cultural camps, and village science applications. Each initiative is implemented in one of the five Alaska Native cultural regions each year on a 5-year rotational schedule. The following themes cut across all initiatives and regions each year: documenting cultural scientific knowledge, indigenous teaching practices, standards for culturally-based curriculum, teacher support systems, and appropriate assessment practices. Twelve activities used to implement the initiatives are briefly described. Entering its third year, the AKRSI has contributed to a decrease in the dropout rate and increases in student achievement scores; the number of rural students attending college; and the number of Native students pursuing studies in fields of science, math, and engineering. Contains 14 references. (TD)

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CULTURE, CHAOS AND COMPLEXITY:

Catalysts for Change in Indigenous Education

by

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Culture, Chaos and Complexity: Catalysts for Change in Indigenous Education

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Education in rural Alaska is a fertile testing ground for the emerging theory of complex adaptive systems. The newly established sciences of "complexity" and "chaos" have derived from the study of complex, dynamic physical (e.g., weather), biological (e.g., animal behavior) and economic (e.g., the stock market) systems that exhibit adaptive patterns of self-organization under conditions which on the surface appear chaotic (Waldrop, 1994; Gleick, 1987). The constructs, principles and theories emerging under the banners of chaos and complexity are now being extended to the study of human social systems (Epstein and Axtell, 1996), and in their application to the management of formal organizations as complex adaptive systems (Wheatley, 1992). It is the latter two applications of complexity theory that are being brought to bear on education in rural Alaska through the educational reform strategy of the Alaska Rural Systemic Initiative.

The central focus of the AKRSI reform strategy is the fostering of interconnectivity and complementarity between two functionally interdependent but largely disconnected complex systems -- the indigenous knowledge systems rooted in the Native cultures that inhabit rural Alaska, and the formal education systems that have been imported to serve the educational needs of rural Native communities. Within each of these evolving systems is a rich body of complementary knowledge and skills that, if properly explicated and leveraged, can serve to strengthen the quality of educational experiences for students throughout rural Alaska.

Indigenous Knowledge Systems

The 16 distinct indigenous cultural and language systems that continue to survive in rural communities throughout Alaska have a rich cultural history that still governs much of everyday life in those communities. For over six generations, however, Alaska Native people have been experiencing recurring negative feedback in their relationships with the external systems that have been brought to bear on them, the consequences of which have been extensive marginalization of their knowledge systems and continuing dissolution of their cultural integrity. Though diminished and often in the background, much of the Native knowledge systems, ways of knowing and world views remain intact and in practice, and there is a growing appreciation of the contributions that indigenous knowledge can make to our contemporary understanding in areas such as medicine, resource management, meteorology, biology, and in basic human behavior and educational practices.

Indigenous societies, as a matter of survival, have long sought to understand the irregularities in the world around them, recognizing that nature is underlain with many unseen patterns of order. For example, out of necessity, Alaska Native people have had to learn to decipher and adapt to the constantly changing patterns of weather and seasonal cycles. The Native elders have long been able to predict weather based upon observations of subtle signs that presage what subsequent conditions are likely to be. The wind, for example, has irregularities of constantly varying velocity, humidity, temperature, and direction due to topography and other factors. There are non linear dimensions to clouds, irregularities of cloud formations, anomalous cloud luminosity, and different forms of precipitation at different elevations. Behind these variables, however, there are patterns, such as prevailing winds or predictable cycles of weather phenomena, that can be discerned through long observation. Over time, Native people have observed that the weather's dynamic is not unlike fractals, where the part of a part is part of another part which is a part of still another part, and so on.

For indigenous people there is a recognition that many unseen forces are in action in the elements of the universe, and that very little is naturally linear, or occurs in a two-dimensional grid or a three

dimensional cube. They are familiar with the notions of irregularities and anomalies of form and force (i.e., chaos). Through long observation they have become specialists in understanding the interconnectedness and holism of all things in the universe (Kawagley, 1995).

The new sciences of chaos and complexity and the study of non linear, dynamic systems have helped Western scientists to also recognize order in phenomena that were previously considered chaotic and random. These patterns reveal new sets of relationships which point to the essential balances and diversity that help nature to thrive. Indigenous people have long recognized these interdependencies and strive for harmony with all of life. Western scientists have constructed the holographic image, which lends itself to the Native concept of everything being connected. Just as the whole contains each part of the image, so too does each part contain the makeup of the whole. The relationship of each part to everything else must be understood to produce the whole image (Wilber, 1985). With fractal geometry, holographic images and the sciences of chaos and complexity, the Western thought-world has begun to focus more attention on relationships, as its proponents recognize the interconnectedness in all elements of the world around us (Capra, 1996). Thus there is a growing appreciation of the complementarity that exists between what were previously considered two disparate and irreconcilable systems of thought (Kawagley and Barnhardt, 1998).

Among the qualities that are often identified as inherent strengths of indigenous knowledge systems are those that have been described by Michael McMaster as the focal constructs in the study of the dynamics of complex adaptive systems: "Complexity theory is about identity, relationships, communication, mutual interactions" (Stamps, 1997: pg 36). These are qualities that focus on the processes of interaction between the parts of a system, rather than the parts in isolation, and it is to those interactive processes that the AKRSI reform strategy is directed. In so doing, however, attention must extend beyond the relationships of the parts within an indigenous knowledge system and take into account the relationships between the system as a whole and the other external systems with which it interacts, the most critical and pervasive being the formal education systems which now impact the lives of every Native child, family and community in Alaska.

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The Formal Education System

Formal education is still an evolving, emergent system that is far from equilibrium in rural Alaska, thus leaving it vulnerable and malleable in response to a well-crafted strategy of systemic reform. The advantage of working with systems that are operating "at the edge of chaos" is that they are more receptive and susceptible to innovation and change as they seek equilibrium and order in their functioning (Waldrop, 1994). Such is the case for many of the educational systems in rural Alaska, for historical as well as unique contextual reasons. From the time of the arrival of the Russian fur traders in the late 1700's up to the early 1900's, the relationship between most of the Native people of Alaska and education in the form of schooling (which was reserved primarily for the immigrant population at that time) may be characterized as two mutually independent systems with little if any contact, as illustrated by the following diagram:

Dual System

Prior to the epidemics that wiped out over 60% of the Alaska Native population in the early part of the 20th century, most Native people continued to live a traditional self-sufficient lifestyle with only limited contact with fur traders and missionaries (Napoleon, 1991). The oldest of the Native Elders of today grew up in that traditional cultural environment and still retain the deep knowledge and high language that they acquired during their early childhood years. They are also the first generation to have experienced significant exposure to schooling, many of them having been orphaned as a result of the epidemics. Schooling, however, was strictly a one-way process at that time, mostly in distant boarding schools with the main purpose being to assimilate Native people into Western society, as practiced by the missionaries and school teachers (who were often one and the same). Given the total disregard (and often derogatory attitude) toward the indigenous knowledge and belief systems in the

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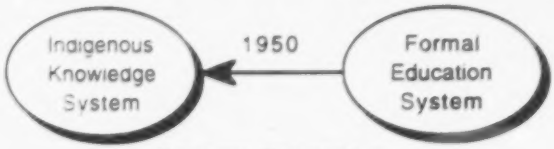
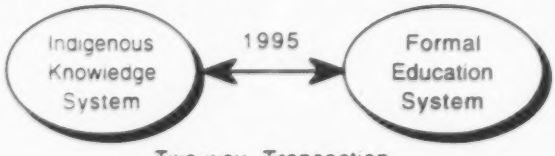
Native communities, the relationship between the two systems was limited to a one-way flow of communication and interaction up through the 1950's, and thus can be characterized as follows:



One-way Transaction

By the early 1960's, elementary schools had been established in most Native communities, and by the late 1970's, a class action lawsuit had forced the state to develop high school programs in the villages throughout rural Alaska. At the same time (in 1976), the federal and state-operated education systems were dismantled and in their place over 20 new school districts were created to operate the schools in rural communities. That placed the rural school systems serving Native communities under local control for the first time, and concurrently a new system of secondary education was established that students could access in their home community. These two steps, along with the development of bilingual and bicultural education programs under state and federal funding and the influx of a limited number of Native teachers, opened the doors for the beginning of two-way interaction between the schools and the Native communities they served, as illustrated by the following diagram depicting rural education by 1995 (when the AKRSI was initiated):



Two-way Transaction

Despite the structural and political reforms that took place in the 70's and 80's, rural schools have continued to produce a dismal performance record by most any measure, and Native communities continue to experience significant social, cultural and educational problems, with most indicators placing communities and schools in rural Alaska at the bottom of the scale nationally. While there has been some limited representation of local cultural elements in the schools (e.g., basket making, sled building, songs and dances), it has been at a fairly superficial level with only token consideration

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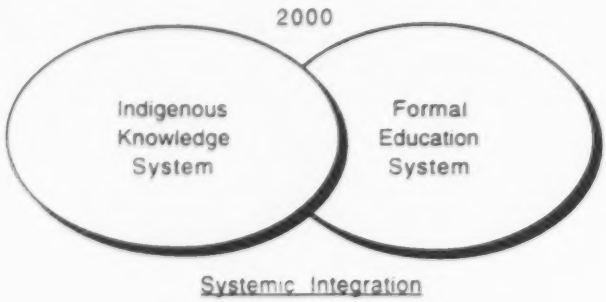
given to the significance of those elements as integral parts of a larger complex adaptive cultural system that continues to imbue peoples lives with purpose and meaning outside the school setting. While there is some minimum level of interaction between the two systems, functionally they remain worlds apart, with the professional staff overwhelmingly non-Native (94% statewide) and with a turnover rate averaging 30-40% annually.

With these considerations in mind, the Alaska Rural Systemic Initiative has sought to serve as a catalyst to promulgate reforms focusing on increasing the level of interconnectivity and complementarity between the formal education systems and the indigenous knowledge systems of the communities in which they are situated. In so doing, the AKRSI seeks to bring the two systems together in a manner that promotes a synergistic relationship such that the two previously separate systems join to form a more comprehensive holistic system that can better serve all students, not just Alaska Natives, while at the same time preserving the essential integrity of each component of the larger over-lapping system. The new interconnected, interdependent, integrated system we are seeking to achieve may be depicted as follows:



Forging an Emergent System of Education for Rural Alaska

In May, 1994 the Alaska Natives Commission, a federal/state task force that had been established two years earlier to conduct a comprehensive review of programs and policies impacting Native people, released a report articulating the need for all future efforts addressing Alaska Native issues to be initiated and implemented from within the Native community. The long history of failure of external

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efforts to manage the lives and needs of Native people made it clear that outside interventions were not the solution to the problems, and that Native communities themselves would have to shoulder a major share of the responsibility for carving out a new future. At the same time, existing government policies and programs would need to relinquish control and provide latitude and support for Native people to address the issues in their own way, including the opportunity to learn from their mistakes. It is this two-pronged approach that is at the heart of the AKRSI educational reform strategy -- Native community initiative coupled with a supportive, adaptive, collaborative education system.

Manuel Gomez, in his analysis of the notion of systemic change in education has indicated that, "Educational reform is essentially a cultural transformation process that requires organizational learning to occur: changing teachers is necessary, but not sufficient. Changing the organizational culture of the school or district is also necessary" (1997). This statement applies to both the formal education system and the indigenous knowledge systems in rural Alaska. The culture of the education system as reflected in rural schools must undergo radical change, with the main catalyst being standards-based curriculum grounded in the local culture. In addition, the indigenous knowledge systems need to be documented, articulated and validated, again with the main catalyst being standards-based curriculum grounded in the local culture. If we are to abide by the principles of complexity theory and seek to foster the emergent properties of self-organization that can produce the systemic integration indicated above, then it is essential that we work through and within the existing systems. The challenge is to identify the units of change that will produce the most results with the least effort. In the terms of complexity theory, that means targeting the elements of the system that serve as the "attractors" around which the emergent order of the system can coalesce (Peck and Carr, 1997). Once these critical agents of change have been appropriately identified, a "gentle nudge" in the right places can produce powerful changes throughout the system (Jones, 1994).

The key agents of change around which the AKRSI educational reform strategy has been constructed are the Alaska Native educators working in the formal education system coupled with the Native Elders who are the culture-bearers for the indigenous knowledge system, along with the Quality

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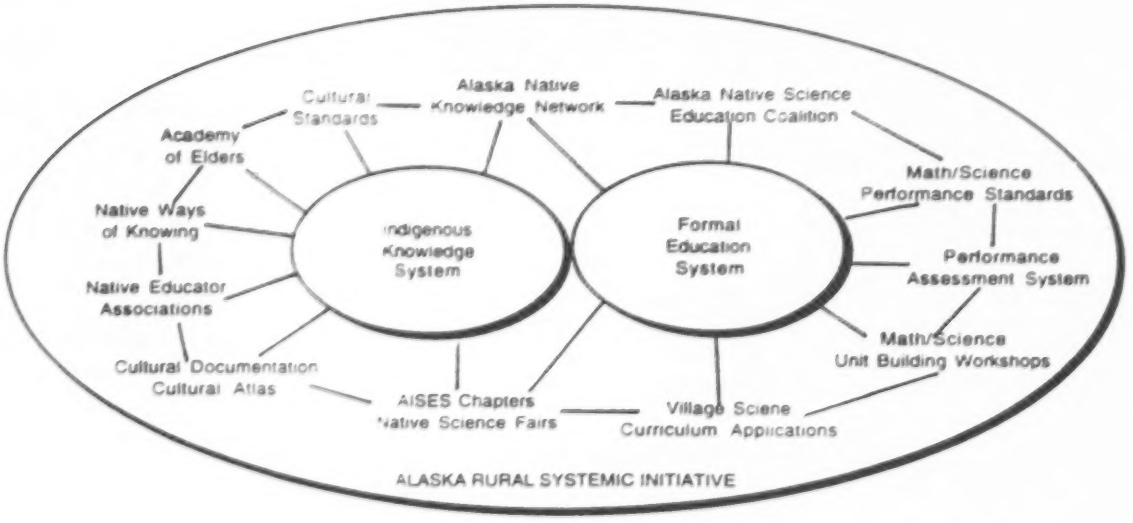
Schools Initiative and academic content standards adopted by the Alaska Department of Education. Together, these agents of change constitute a considerable set of "attractors" that are serving to reconstitute the way people think about and do education in rural schools throughout Alaska. The role of the Alaska Rural Systemic Initiative has been to guide these agents through an on-going array of locally-generated, self-organizing activities that produce the "organizational learning" needed to move toward a new form of emergent and convergent system of education for rural Alaska (Marshall, 1996). The overall configuration of this emergent system may be characterized as two interdependent though previously separate systems being nudged together through a series of initiatives maintained by a larger system of which they are constituent parts, as illustrated in the following diagram:



The components of the emergent system representing the indigenous knowledge sub-system and the formal education sub-system are depicted here as they appear two years into the systemic reform initiative. Over the first two years, the two sub-systems have been brought in contact with one another with an increasing level of two-way interaction occurring daily that is slowly building the interconnectivity and complementarity of functions that is the goal of the reform strategy. Each of the initiatives in the field surrounding the two sub-systems serve as a catalyst to energize the "attractors" within the sub-systems in ways that reinforce the efforts of the agents of change identified previously.

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For example, the Alaska Native Knowledge Network assembles and provides easy access to curriculum resources that support the work underway on behalf of both the indigenous knowledge system and the formal education system. In addition, the ANKN newsletter, *Sharing Our Pathways*, provides an avenue for on-going communication between all elements of the constituent systems. Concurrently, the AKRSI is collaborating with the Alaska Department of Education in bringing Native/science teachers together to develop performance standards based on the state math and science standards that take into consideration the cultural context in which students acquire and demonstrate their knowledge.

Together, these initiatives (and others to be described below) constitute the Alaska Rural Systemic Initiative and are intended to generate a strengthened complex adaptive system of education for rural Alaska that can effectively integrate the strengths of the two constituent emergent systems. The exact form this new integrated system will take remains to be seen as its properties emerge from the work that is underway. Accepting the openendedness and unpredictability associated with complexity theory, and relying on the emergent properties associated with the adage, "think globally, act locally," we are confident that we will know where we are going when we get there. It is the actions associated with "thinking systemically, acting categorically" that will guide us along the way, so we continue to move in the direction established by the AKRSI educational reform strategy outlined above.

Intervention Activities: An Overview

The Alaska Rural Systemic Initiative was established in 1994 under the auspices of the Alaska Native/Rural Education Consortium, representing over 50 organizations impacting education in rural Alaska. The institutional home base and support structure for the AKRSI is provided through the Alaska Federation of Natives in cooperation with the University of Alaska, with funding from the National Science Foundation and the Annenberg Rural Challenge. The purpose of the Alaska Rural Systemic Initiative is to implement a set of initiatives that systematically document the indigenous knowledge

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systems of Alaska Native people and develop pedagogical practices that appropriately integrate indigenous knowledge and ways of knowing into all aspects of education. In practical terms, the most important intended outcome is an increased recognition of the complementary nature of Native and western knowledge, so both can be more effectively utilized as a foundation for the school curriculum and integrated into the way we think about learning and teaching.

The overall structure of the Alaska Rural Systemic Initiative is organized around the following five major initiatives, each of which is being implemented in one of the five Alaska Native cultural regions each year on an annual rotational scale-up schedule over a five-year cycle. In this way, the initiatives can be adapted to the cultural and geographic variability of each of the regions, while at the same time engaging the state-level support structures throughout the five-year cycle.

NSF/ARC Combined Yearly Cycle of Activities by Cultural Region

NSF						Annenberg
Rural Systemic Initiative/Year (1995-2000)	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-2000**	**Rural Challenge Initiative/Year** (1996-2000)
Native Ways of Knowing/Teaching	Yup'ik Region	Inupiaq Region	Athabascan Region	Aleut/Alut. Region	Southeast Region	**ANCSA and the Subsistence Econ.**
Culturally Aligned Curriculum	Southeast Region	Yup'ik Region	Inupiaq Region	Athabascan Region	Aleut/Alut. Region	**Language/Cultural Immersion Camps**
Indigenous Science Knowledge Base	Aleut/Alut. Region	Southeast Region	Yup'ik Region	Inupiaq Region	Athabascan Region	**Oral Tradition as Education**
Elders and Cultural Camps	Athabascan Region	Aleut/Alut. Region	Southeast Region	Yup'ik Region	Inupiaq Region	**Reclaiming Tribal Histories**
Village Science Applications	Inupiaq Region	Athabascan Region	Aleut/Alut. Region	Southeast Region	Yup'ik Region	**Living in Place**

Along with the rotational schedule of regional initiatives, there are also a series of cross-cutting themes that integrate the initiatives within and across regions each year. While the regional initiatives focus on particular domains of activity through which specialized resources are brought to bear in

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each region each year (culturally aligned curriculum, indigenous science knowledge base, etc.), the following themes cut across all initiatives and regions each year:

1. Documenting cultural/scientific knowledge
2. Indigenous teaching practices
3. Standards/culturally-based curriculum
4. Teacher support systems
5. Appropriate assessment practices

In this way, schools across the state are engaged in common endeavors that unite them, at the same time that they are concentrating on particular initiatives in ways that are especially adapted to their respective cultural region. Each set of initiatives and themes build on each other from year to year and region to region through a series of statewide events that bring participants together from across the regions. These include working groups around various themes, Academies of Elders, statewide conferences, the AN/RE Consortium meetings, the Alaska Native Science Education Coalition and the Alaska Native Knowledge Network.

Following is a brief description of some of the key AKRSI-sponsored initiatives to illustrate the kind of activities that are underway, as they relate to the overall educational reform strategy outlined above.

Alaska Native Knowledge Network - A bimonthly newsletter, world wide web site (http://www.uaf.alaska.edu/ankn), and a culturally-based curriculum resources clearinghouse have been established to disseminate the information and materials that are being developed and accumulated as the AKRSI initiatives are implemented throughout rural Alaska.

S.P.I.R.A.L. Curriculum Framework - The ANKN curriculum clearinghouse is identifying and cataloging curriculum resources applicable to teaching activities revolving around 12 broad cultural themes organized on a chart that provides a "Spiral Pathway for Integrating Rural Alaska Learning." The themes that make up the S.P.I.R.A.L. framework are family,

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language/communication, cultural expression, tribe/community, health/wellness, living in place, outdoor survival, subsistence, ANCSA, applied technology, energy/ecology, and exploring horizons. The curriculum resources associated with each of these themes can be accessed through the ANKN web site.

Cultural Documentation/Atlas - Students in rural schools are interviewing Elders in their communities and researching available documents related to the indigenous knowledge systems, and then assembling the information they have gathered into a multimedia format for publication as a "Cultural Atlas" on CD-ROM and the Internet. Documentation has focused on themes such as weather prediction, edible and medicinal plants, geographic place names, flora and fauna, moon and tides, fisheries, subsistence practices, food preservation, outdoor survival and the aurora.

Native Educator Associations - Associations of Native educators have been formed in each cultural region to provide an avenue for sustaining the initiatives that are being implemented in the schools by the AKRSI. The regional associations sponsor curriculum development work, organize Academies of Elders and host regional and statewide conferences as vehicles for disseminating the information that is accumulated.

Native Ways of Knowing - Each cultural region is engaged in an effort to distill core teaching/learning processes from the traditional forms of cultural transmission and to develop pedagogical practices in the schools that incorporate these processes (e.g., learning by doing/experiential learning, guided practice, detailed observation, intuitive analysis, cooperative/group learning, listening skills).

Academies of Elders - Native educators are convening with Native Elders around a local theme and a deliberative process through which the Elders share their traditional knowledge and the Native educators seek ways to apply that knowledge to teaching various components of the standards-based curriculum. The teachers then field test the curriculum ideas they have developed, bring that

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experience back to the Elders for verification, and then prepare a final set of curriculum units that are pulled together and shared with other educators.

Cultural Standards - A set of "Alaska Standards for Culturally Responsive Schools" have been developed for students, teachers, curriculum, schools and communities that provide explicit guidelines for ways to integrate the local culture and environment into the formal education process so that students are able to achieve cultural well-being as a result of their schooling experience.

Village Science Curriculum Applications - Three volumes of village oriented science curriculum resources are being developed in collaboration with rural teachers for use in schools throughout Alaska. They will serve as a supplement to existing curriculum materials to provide teachers with ideas on how to relate the teaching of basic science and math concepts to the surrounding environment.

AISES Chapters/Native Science Fairs - K-12 chapters of the American Indian Science and Engineering Society are being formed in rural districts serving each cultural region. These chapters are participating in AISES Science Camps and are sponsoring Native Science Fairs in which the projects are judged for their science content by experienced science teachers and for their cultural content by Native Elders. The winners of the regional fairs attend the national AISES Science Fair in the Spring.

Alaska Native Science Education Coalition - The ANSEC is made up of representatives from over 20 agencies, professional organizations and other programs that have an interest and role in science and math education in rural Alaska schools. The Coalition is seeking to bring its vast array of curriculum and professional development resources into focus around the implementation of standards/culturally-based science curriculum, including the incorporation of rural/cultural considerations in the Coalition members own materials and practices (e.g., Alaska Science

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Consortium workshops. Project Wild curriculum materials. National Park Service interpretive programs).

Math/Science Unit-building Workshops - Under the sponsorship of the ANSEC, small regional teams of science teachers, Native teachers, Elders and scientists (each of whom learn from the others) are assembled for two days of concentrated work aimed at building science and math curriculum units around a locally identified theme that can serve as a focus for meeting state content standards starting from a knowledge base grounded in the local environment (e.g., weather, food preservation, moon/tides, birch trees, berries, measuring systems). The units are then field tested by the participating teachers, refined and made available to teachers throughout the state as models for an on-going process of standards-based and culturally-grounded curriculum development.

Math/Science Performance Standards - Performance standards in the areas of math and science are being developed that will serve as benchmarks for the state assessment system in those content areas. Through AKRSI support, representation from rural/Native communities is helping to incorporate the various cultural and geographic perspectives needed to provide equity in the assessment process.

All tasks associated with implementing the various initiatives are being subcontracted out to the appropriate state or regional entities with responsibility and/or expertise in the respective action area. In this way, the expertise for implementing the various initiatives is cultivated within the respective regions, and the capacity to carry on the activities beyond the life of AKRSI will be imbedded in the schools and communities for which they are intended. The statewide support system (newsletter, web site, curriculum resources, etc.) for the regional initiatives is being coordinated by the AKRSI staff, including three Co-Directors (with duties for administration, Native education and rural education), along with a Regional Coordinator for each cultural region to maximize the synergistic impact of the initiatives within and between regions.

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Scaling Up the Change Process

During the first year of implementation of the intervention strategy outlined above, the locus of activity was concentrated in one or two key school districts in each of the five regions, so that sufficient time and effort could be put into identifying appropriate staff and working through the details of each initiative to determine its efficacy and manageability. In the second year, the number of school districts was doubled to include most of the rural districts with 50% or more Alaska Native student populations. One school district in each region from the original target districts has also been identified as the "focal district" for purposes of intensive implementation of the initiatives, and for more detailed tracking of the impact of the systemic reform strategy at the school/district level.

During the remaining years, the primary focus for implementation of the AKRSI initiatives will continue to be on the 20 rural school districts currently serving as partners in the school reform effort, with an emphasis on pushing the initiatives through to a greater depth of implementation. However, the remaining rural schools (serving primarily non-Native students with a higher academic performance record), as well as the urban school districts which also serve a significant number of Alaska Native students, will be included in the dissemination of the materials that are generated and invited to participate in various AKRSI sponsored events. In addition, effort will be devoted during the fifth year to insure that the necessary policies are in place at the district and state levels to institutionalize the changes that have been implemented.

As we shift the initiative emphases from one cultural region to the next, continuity is provided through the efforts and guidance of an AKRSI Regional Coordinator in each region, who insures that the activities from each initiative continue to be emphasized in the original region, and are built upon as they are extended to the new region. Thus, the scale-up process for each initiative is cumulative within each region as well as across regions. The data gathering for assessment purposes at the end of each year takes place across all regions, so that changes can be tracked from year to year across all initiatives.

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Summary of Progress to Date

The Alaska Rural Systemic Initiative has just completed its second year of implementation and enters the third year with a full complement of rural school reform initiatives in place stimulating a reconstruction of the role and substance of schooling in rural Alaska. The educational reform strategy we have chosen -- to foster interconnectivity and complementarity between the formal education system and the indigenous communities being served in rural Alaska based on current concepts, principles and theories associated with the study of complex adaptive systems -- has produced an initial increase in student achievement scores, a decrease in the dropout rate, an increase in the number of rural students attending college, and an increase in the number of Native students choosing to pursue studies in fields of science, math and engineering. The initiatives outlined above have demonstrated the viability of introducing strategically placed innovations that can serve as "attractors" around which a new, self-organizing, integrated educational system can emerge which shows signs of producing the quality of learning opportunity that has eluded schools in Native communities for over a century. The substantial realignments that are already evident in the increased interest and involvement of Native people in education in rural communities throughout Alaska point to the applicability of complexity theory in shaping reform in educational systems.

While the NSF funding of the Alaska RSI initiative has been the catalyst for the core reform strategy as it applied to the areas of math and science, we have been fortunate to acquire substantial supplementary funding from the Annenberg Rural Challenge and other sources to implement comparable initiatives in the areas of social studies, fine arts and language arts. All of these funds combined provide an opportunity to address the issues facing schools in Native communities throughout rural Alaska in a truly comprehensive and systemic fashion.

As a means to help document the process of systemic reform in rural schools, we have joined in two projects that will result in comprehensive case studies of educational practices and reform efforts in

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nine rural communities/schools in Alaska, to be conducted over the next three years. Seven of the case studies are funded through the Northwest Regional Educational Laboratory by a field-initiated grant from the National Institute for At-Risk Youth under USDOE, and the other two are being administered by Harvard University through a grant from the Annenberg Foundation. Since all of the communities are in school districts associated with the Alaska Rural Systemic Initiative, we will be able to obtain a good cross-section of in-depth data on the impact of the AKRSI reform effort over the next few years.

We are mindful of the responsibilities associated with taking on long-standing, intractable problems that have plagued schools in indigenous settings throughout the world for most of this century, and we have made an effort to be cautious about raising community expectations beyond what we can realistically expect to accomplish. We are also mindful of the larger context in which the AKRSI operates and the expectations of the funding agencies with mandates to support initiatives that can contribute to a larger national agenda. Our experience thus far is such that we are confident in the route we have chosen to initiate substantive reform in rural schools serving Alaska's Native communities, and while we expect to encounter plenty of problems and challenges along the way, we are capitalizing on a broadly supportive climate to introduce changes that will benefit not only rural schools serving Native students, but will be instructive for all schools and all students. We welcome the opportunity to continue to explore these ideas and find ways to strengthen and renew the educational systems serving people and communities throughout our society.

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